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ABSTRACT

This bibliography cites references dealing with background material on the functions of the human brain and current research on sex differences in brain development. A list of 10 books published since 1974 is followed by a more extensive annotated bibliography of 29 articles, and a bibliography of 19 reports, complete with ERIC reference numbers and instructions for retrieving the documents. Sample forms and instructions for ordering ERIC documents are included. The articles explore such topics as sex differences in cognitive functioning, brain hemispheric differences, cultural differences in information processing, symmetry and perceptual comprehension of children, spatial ability, dyslexia, left- and right-handedness, creativity, and age differences. Many articles focus on research with children and the implications of such research results for educators. (NRB)

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SEX DIFFERENCES AND BRAIN DEVELOPMENT:
A BIBLIOGRAPHY

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INTRODUCTION

Does Johnny's rough and tumble play reflect sexual stereotypes for boys' behavior or does it reflect biologically inherent differences between boys' and girls' brains? A current "hot" topic in psychology, sex differences in brain development is becoming a "hot" topic for educators, too. While it's too early to know how brain research will affect our lives, for educators the findings suggest tantalizing, provocative ideas about how people think, learn and memorize.

This selective bibliography of books, articles and educational documents includes (1) background material on the functions of the human brain and (2) current research on sex differences in brain development.

BOOKS

Blakemore, Colin. Mechanics of the Mind. Cambridge University Press, 1977.

Buzan, Tony. Use Both Sides of Your Brain. Dutton, 1976.

Claycomb, Mary. Brain Research and Learning. National Education Association, 1978.

Fincher, Jack. The Brain: Mystery of Matter and Mind. U. S. News Books, 1981.

Grady, Michael P. and Emily A. Luecke. Education and the Brain. Phi Delta Kappa Educational Foundation, 1978.

Lausch, Erwin. Manipulation: Dangers and Benefits of Brain Research. Viking Press, 1974.

National Society for the Study of Education. Education and the Brain. University of Chicago Press, 1978.

Restak, Richard M. The Brain: The Last Frontier. Doubleday, 1979.

Wittrock, M. C. The Human Brain. Prentice Hall, 1977.

Young, J. Z. Programs of the Brain. Oxford University Press, 1978.

ARTICLES

Bagnara, Sebastiano and others. "Sex-related Differences in Hemispheric Asymmetries in Processing Simple Geometrical Figures." Perceptual and Motor Skills. v51. n1. p215-19. August 1980.

Eight men and eight women responded "same" or "different" to pairs of geometric figures. Male subjects showed a left visual-field advantage regardless of the level of processing, whereas female subjects did not show a clear-cut hemispheric asymmetry. Results are discussed in terms of sex differences in processing strategies.

Berlin, Donna F. and Marlin L. Languis. "Age and Sex Differences in Measures of Brain Lateralization." Perceptual and Motor Skills. v50. n3. p959-67. June 1980.

Seventy-nine kindergarten and sixth-grade right-handed subjects were administered tasks to infer left-hemisphere and right-hemisphere processing and a measure of field dependence/independence. Results correlating to age and sex are discussed.

Brooks, Richard. "Hemispheric Differences in Memory: Implications for Education." Clearinghouse. v53. n5. p248-250. January 1980.

The author presents findings from brain hemisphere research indicating a complex dual memory process which separately and simultaneously processes input through visual and verbal encoding strategies. He draws implications from this for educational goals, instructional methods, and student evaluation procedures.

Burstein, B. and L. F. Jarvak. "Sex Differences in Cognitive Functioning: Evidence, Determinants, Implications." Human Development. v23. n5. p289-313. 1980.

Examines the evidence for sex differences in cognitive functioning, and evaluates the evidence for hormonal, genetic, neuroanatomical, and cultural determinants of such differences. Inadequacies in research methodology are noted.

Cattey, Margaret. "Cultural Differences in Processing Information." Journal of American Indian Education. v20. n1. p23-29. October 1981.

A study indicating that information processing may be culturally specific and that processing through different brain hemispheres may be a result of how a person perceives his world focuses on the Navajo Tribe and its cultural and behavioral similarities with the Chinese, and compares those groups to Anglo-Americans.

Cheong, George. "Relations Among Symmetry, Asymmetry, Perceptual Comprehension of Numerals by Kindergarten and First Grade Children." British Journal of Psychology. v71. p275-82. May 1980.

This study of 73 children sought to determine if children's perceptual comprehension of numerals is higher when they are shown symmetrical rather than asymmetrical arrangements of pegs, and if comprehension scores related to age, sex, and/or social class. The main hypothesis was rejected but some age and class differences were found.

Clear, Sarah-Jane. "Sex Differences in Spatial Ability: A Critique." International Journal of Behavioral Development. v1. n3. p241-46. July 1978.

Explores (1) problems of the validity of tests of spatial ability, and (2) problems of the recessive gene influence theory of the origin of sex differences in spatial ability. Studies of cognitive strategies in spatial problem solving are suggested as a way to further investigate recessive gene influence.

Dalby, J. Thomas. "Deficit or Delay: Neuropsychological Models of Development Dyslexia." Journal of Special Education. v13. n3. p239-64. Fall 1979.

The review examines issues and research relating to the involvement of the central nervous system in reading disorders. Questions regarding subtypes, pre- and perinatal influences, genetics, sex differences, and early identification are briefly surveyed along with a summary of major research findings in neuropsychology and neurology.

Doerr, Susan L. "Conjugate Lateral Eye Movement, Cerebral Dominance, and the Figural Creativity Factors of Fluency, Flexibility, Originality, and Elaboration." Studies in Art Education. v21. n3. p5-11. 1980.

This study explored general relationships between figural creativity, as measured by the Torrance Tests of Creative Thinking, and cerebral dominance, as identified by the conjugate lateral eye movement (CLEM) interview procedure. Subjects were 175 adults. Results indicated no significant differences in figural creativity due to brain dominance type or sex.

Elliott, Portia C. "Going 'Back to Basics' in Mathematics Won't Prove Who's 'Right' but Who's 'Left' (Brain Duality and Mathematics Learning)." International Journal of Mathematical Education in Science and Technology. v11. n2. p213-19. April-June 1980.

The aims of the article are: (1) to outline the general tenets of the "back to basics" movements; (2) to indicate how these tenets go counter to emerging research on hemispheric specialization; and (3) to suggest methods which are brain-compatible and likely to produce competent creative problem solvers.

Epstein, Herman T. "A Neuroscience Basis for Reorganizing Middle Grades Education." Educational Leadership. v35. n8. pp656-8, 660. May 1978.

Because the brains of 12-14 year olds are in a slow-growth period, middle schools should concentrate on developing maturity in existing cognitive skills rather than on introducing new skills.

Fischer, Kurt W. "A Theory of Cognitive Development: The Control and Construction of Hierarchies of Skills." Psychological Review. v87. n6. p477-531. November 1980.

Skill theory attempts to provide tools for the prediction of developmental sequences in any domain at any point in development. The theory suggests a common framework for integrating developmental analyses of cognitive, social, perceptual/motor skills, and behavioral changes in learning and problem solving.

Flanery, Randall C. and John D. Balling. "Developmental Changes in Hemispheric Specialization for Tactile Spatial Ability." Developmental Psychology. v12. n6. p48-49, 120. November 1978.

First-, third-, and fifth-grade children and adults performed a tactile shape-discrimination task. Changes in the magnitude of differences between performance in the left and right perceptual fields were examined. Results suggested that the right hemisphere becomes progressively more specialized for tactile spatial ability with increasing age.

Goleman, Daniel. "Special Abilities of the Sexes: Do They Begin in the Brain." Psychology Today. v12. n6. p48-49, 120. November 1978.

Researchers are finding evidence that some differences between the sexes--chiefly in spatial and verbal talents start with differences in the way male and female brains are organized. Other experts challenge the data and warn that they could provide a scientific justification for sexism.

Gray, Esther Cappon. "Brain Waves and Thinking Styles." Clearing House. v54. n3. p127-32. November 1980.

The author reviews some research, particularly that of Roger Sperry, substantiating the existence of different thinking styles in the two brain hemispheres and the development of this differentiation in infancy and childhood. She draws some implications of elementary teaching.

Gregory, R. J. and others. " Left-Handedness and Spatial Reasoning Abilities: The Deficit Hypothesis Revisted." Intelligence. v4. n2. p157-59. April-June 1980.

Left-handers with an inverted handwriting posture were compared with other left-handers and with right-handers on a spatial reasoning test. Results were consistent with the hypothesis that left-inverted subjects had relatively bilateral representation of verbal and spatial functions. Bilateral representation is assumed to be inefficient.

Levy, Jerre. "Variations in Cerebral Organization as a Function of Handedness: Hand Posture in Writing, and Sex." Journal of Experimental Psychology: General. v107. n2. p119-44. June 1978.

Two tachistoscopic tests of cerebral lateralization, one measuring spatial functions and one measuring verbal function, were administered to 73 subjects classified by handedness, hand posture writing, and sex. Tests the proposal that an inverted hand posture is indicative of a language hemisphere ipsalateral to the dominant hand and that the typical, noninverted posture is indicative of the usual contralateral relation.

McCallum, R. Steve and Shawn M. Glynn. "Hemispheric Specialization and Creative Behavior." Journal of Creative Behavior. v13. n4. p263-73. 1979.

Research on the relationship of cognitive processes and hemispheric specialization is reviewed. Considered are findings concerning dichotic listening, tachistoscopic image presentation, electroencephalographic responses, conjugate lateral eye movement, and creativity.

McGee, Mark G. "Human Spatial Abilities: Psychometric Studies and Environmental, Genetic, Hormonal, and Neurological Influences." Psychological Bulletin. v86. n5. p889-918. September 1979.

Reviews psychometric studies of human spatial ability and studies of environmental, genetic, hormonal, and neurological influences that interact in producing individual variation in spatial test scores.

Palmer, Thelma. "Why Our Kids Can Write; or, Running Slo's Through the Right Brain Equals the Morphology of Diddley Doos." English Journal. v69. n6. p48-51. September 1980.

Proposes that offering students activities that exercise right-brain functions (nonverbal, nonrational, spatial, and intuitive) helps students become more fully developed human beings and better writers.

Parlee, Mary B. "Comments on 'Roles of Activation and Inhibition in Sex Differences in Cognitive Abilities' by D. M. Broverman, E. L. Klainber, Y. Kobayshi, and W. Vogel." Psychological Review. v79. n2. pp180-4. March 1972.

Article rebuts the theory that "known sex differences in cogitive abilities reflect sex-related differences in physiology".

Pereile, Ira B. "Attention to Stimulus Presentation Mode as a Function of Sex." Journal of Psychology. v102. p225-33. July 1979.

In a study of attending behavior during the crossover period (12-13 years), when preferences shift from auditory to visual stimuli, females switched their preferences significantly earlier than did males. Besides biological factors, these sex differences were attributed to differential conditioning of attitudes, reinforcement, and discrimination regarding stimulus presentation mode.

Restak, Richard M. "The Other Difference between Boys and Girls." Educational Leadership. v37. n3. p232-35. December 1979.

This article is adapted from the author's book "The Brain: The Last Frontier," and discusses recent research on the brain that establishes that the brains of boys and girls develop differently and that this affects their learning.

Restak, Richard M. "Viewpoint. The Other Difference between Boys and Girls Association Information." Young Children. v34. n6. p11-14. September 1979.

Uses evidence from recent brain research to prove that many behavioral differences between men and women are based on biologically inherent differences in brain functioning.

Saks, Judith Brody. "Latest Brain Research Offers Lessons in Learning." Executive Educator. v1. n10. p26-28, 40. October 1979.

Reviews some of the recent research on the human brain and discusses the implications of this research for educators.

Sappington, John T. "Measures of Lateral Dominance: Interrelationships and Temporal Stability." Perceptual and Motor Skills. v50. n3. pt.1. p783-90. June 1980.

This study measured test-retest reliabilities and interrelationships of four common measures of lateral dominance: dowel balancing, peg placement, grip strength, and conjugate lateral eye movement. Moderate reliabilities for all measures except grip strength were obtained. Subjects' sex may be an important reliability variable. Correlations among measures were uniformly low.

"Sex Differences: Right Brain Envy." Science News. v115. n23. p375. June 1979.

Results of spatial tests and analytical tasks indicate that girls tend to use the left hemisphere of the brain in processing all the tasks and use it much more so than boys on spatial tasks.

Townes, B. D., and others. "Neuropsychological Correlates of Academic Success among Elementary School Children." Journal of Consulting and Clinical Psychology. v48. n6. p675-84. December 1980.

Significant differences were found between younger and older children on most neuropsychological tests. Girls were found to be superior to boys in verbal reasoning, language skills, and serial perceptual matching skills, whereas boys were superior on tests of spatial memory and motor skills.

Waber, Deborah P. "Sex Differences in Mental Abilities, Hemispheric Lateralization, and Rate of Physical Growth at Adolescence." Developmental Psychology. v13. n1. p29-38. January 1977.

The central thesis of this study was that maturational rate, or its physiological correlates, influences the development of the organization of higher cortical functions and is therefore an important determinant of sex differences in verbal and spatial abilities.

ED039616 Project TALENT. The High School Years: Growth in Cognitive Skills. Interim Report 3. Shaycoft, Marion F. January 1967, 365p. MF-$0.76 HC-$18.40 PLUS POSTAGE. Also available from: project TALENT, American Institutes for Research, Post Office Box 1113, Palo Alto, California 94302

ED063545 Sex Differences in Intellectual Abilities: A Reassessment and A Look At Some New Explanations. Jacklin, Carol Nagy: Maccoby, Eleanor E. April 1972, 22p. MF-$0.76 HC-$1.58 PLUS POSTAGE

ED080163 Neurophysiological Factors in Spatial Development. Harris, Lauren Jay. March 1973, 18p. MF-$0.76 HC-$1.58 PLUS POSTAGE

ED119854 Interaction of Experiential and Neurological Factors in the Patterning of Human Abilities: The Question of Sex Differences in 'Right Hemisphere' Skills. Harris, Lauren Jay. April 1975, 36p. MF-$0.83 HC-$2.06 PLUS POSTAGE

ED120706 Review of Research--Sex Differences in Intellectual Functioning: Myth or Reality. Glickman, Judith R. May 1976, 11p. MF-$0.83 HC-$1.67 PLUS POSTAGE

ED121420 Cerebral Assymetry: Changes in Factors Affecting Its Development. Molfese, Dennis L.; and Others. September 1975, 33p. MF-$0.83 HC-$2.06 PLUS POSTAGE

ED125917 Spatial Abilities, Mathematics Achievement, and the Sexes. McDaniel, Ernest D.; Guay, Roland B. April 1976, 15p. MF-$0.83 HC-$1.67 PLUS POSTAGE

ED126378 The Developmental Dependency Between Two Piagetian Spatial Operations. Guay, Roland B. 1976, 19p. MF-$0.83 HC-$1.67 PLUS POSTAGE

ED141699 Lateral Eye Movement and Cogitation in Junior High School Students. Lauria, Mark W.; Wichman, Harvey. 1974, 9p. MF-$0.83 HC-$1.67 PLUS POSTAGE

ED142286 The Balanced Development of Young Children. Moore, Raymond S.; And Others. 1976, 374p. MF-$0.83 PLUS POSTAGE; HC Not Available from EDRS. Also available from: Hewitt Research Center, 450 Westwood, Berrien Springs, Michigan 49103 ($12.00: discount on quantity orders)

ED142964 Cerebral Asymmetry for Verbal and Nonverbal Sounds in Normal Literate and Illiterate Children. Vargha-Khadem, F.; And Others. March 1977, 20p. MF-$0.83 HC-$1.67 PLUS POSTAGE

ED144711 Influences on Learning in Early Childhood: A Literature Review. Moore, Raymond S.; And Others. August 1975, 307p. MF-$0.83 HC-$16.73 PLUS POSTAGE

ED152117 Cerebral Involvement in the Cognitive Functioning of Bilinguals. Vaid, Jyotsna: Lambert, Wallace E. 1978, 44p. MF-$0.83 HC-$2.06 PLUS POSTAGE

ED154263 Sex Differences in Learning: Some Open Questions. Waetjen, Walter B. September 1977, 27p. MF-$0.83 HC-$2.06 PLUS postage

ED183572 Trends in Male/Female Performance on Cognitive Ability Measures. Flanagan, John C. March 1978, 17p. MF01/PC01 PLUS POSTAGE

ED185071 Toward Explaining Sex Differences in Spatial Ability: An Investigation of Selected Cultural and Neurophysiological Factors. Guay, Roland B: McDaniel, Ernest D. October 1979, 30p. MF01/PC02 PLUS POSTAGE

ED187085 Civilizations of the Left Cerebral Hemisphere. Racle, Gabriel L. 1979, 10p. MF01/PC01 PLUS POSTAGE

ED192385 Brain Specialization Research and the Teaching of Nonverbal Communication. Jensen, Marvin D. 1980, 14p. MF01/PC01 PLUS POSTAGE

ED190614 Developmental and Neurological Implications for Relating Cognition and Affect. Bart, William M. April 1980, 16p. MF01 PLUS POSTAGE

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